Avian influenza virus in Belgian professional poultry holdings: identifying risk farms, a step towards risk based surveillance

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Circulation of notifiable low pathogenic avian influenza H5 and H7 (NLPAI) remains a constant threat for commercial poultry holdings, as it might mutate into highly pathogenic AI (HPAI) and cause serious outbreaks with devastating consequences as seen in past H7HP outbreaks in Europe in 2003, 2004. International standards as well as EU legislation encourage countries to implement risk based surveillance programs to detect NLPAI. The aim of the present study was to determine if some holdings could have an increased risk of being infected. Data set of all holdings tested within the routine AI monitoring program from 2009 till 2011 in Belgium and the results of the biosecurity check list of all active professional poultry holdings were merged together. A generalized linear mixed model was developed to model the probability of having AI NP ELISA positive results given a set of biosecurity characteristics, using 2009-2011 AI monitoring program results. Models at holding and animal level were compared. In parallel a spatial temporal analysis was carried out to determine if any significant spatial or temporal clusters were present. Results showed that the risk of being infected was higher for holdings present in some locations but these risk areas were not specially related with migratory bird flyways. Higher probability of being positive was found in holdings with outdoor access and with different poultry species on the farm (mainly geese and ducks). The results of this study revealed interesting features regarding the epidemiology of LPAI and key elements for setting up a risk based surveillance program, such as required by the international standards and EU legislation.

Risk-based surveillance of chicken diseases using poultry trader networks in Oromia Regional State, Ethiopia

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Highly pathogenic avian diseases such as Newcastle disease and avian influenza have serious social and economic impact in developing countries, including Ethiopia. Live bird markets and poultry traders are known risk factors for the spread of these diseases. In Ethiopia, Oromia regional state is an active chicken breeding region and the live bird markets are located on the main poultry trade road to the capital city Addis Ababa. The networks of chicken movements between 29 shared markets in Oromia regional state were built for festive and non-festive seasons, using a 'trader questionnaire' survey. Five centrality indices, in-degree, out-degree, in-closeness, out-closeness and random-walk betweenness, were calculated and the markets were ordered according to these indices. The festive seasons did not appear to impact the network structure, implying no necessary change of surveillance and control policies during these periods, merely a strengthening due to an increased volume of traded chicken. Three markets emerged as central in the network, with different epidemiological roles. Our findings indicate that these three poultry markets would ideally be chosen in a risk-based type of surveillance system and in targeted control policies.